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Disaster Study Number 8

An Introduction to Methodological Problems of Field Studies in Disasters

Lewis M. Killian

Committee on Disaster Studies

National Academy of Sciences

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The Committee on Disaster Studies is a committee of the Division of Anthropology and Psychology, National Academy of Sciences—National Research Council. It was established as the result of a request made of the Academy—Research Council by the Surgeons General of the Army, the Navy, and the Air Force, that it "conduct a survey and study in the fields of scientific research and development applicable to problems which might result from disasters caused by enemy action."

The function of the Committee is to aid in developing a field of scientific research on the human aspects of disaster. The Committee maintains a clearinghouse on disaster research, publishes a roster of scientific personnel in the field of disaster research, and issues periodically a Newsletter. It makes modest grants to encourage research in disaster studies, advises with responsible officials on problems of human behavior in disaster, and from time to time issues reports on the results of disaster research.

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Disaster Study Number 8
Committee on Disaster Studies
Division of Anthropology & Psychology

AN INTRODUCTION TO METHODOLOGICAL
PROBLEMS OF FIELD STUDIES IN DISASTERS

A SPECIAL REPORT
prepared for
THE COMMITTEE ON DISASTER STUDIES

by

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PREFACE

This is the second special report within the series of Disaster Study Reports. Whereas other special reports deal with the substantive findings of disaster research, the present report is directed to the problems of collecting valid data through field studies in actual disasters.

There is no special discipline of "disaster research" with its own special methodology. Fundamentally, the disaster research worker is challenged and vexed by the same methodological problems that confront all field studies in the behavioral and social sciences. The disaster situation, however, creates certain special or aggravated problems with which the investigator must deal.

Dr. Killian, who has conducted many disaster field studies, describes these problems concisely and clearly in the present report. He has not gone into technical detail or recommended solutions, but attempts only to introduce the potential investigator to the problems he may expect to face. Being forewarned of the difficulties, the competent investigator will solve them in the context of his own research interests and designs.

In issuing this report, the Committee on Disaster Studies hopes not only to provide a service to those undertaking disaster field studies for the first time, but also to stimulate that kind of challenge and scientific curiosity which lead inevitably to sound progress in any field of scientific inquiry.

Carlyle F. Jacobsen
Chairman
Committee on Disaster Studies

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AN INTRODUCTION TO METHODOLOGICAL
PROBLEMS OF FIELD STUDIES IN DISASTERS

Introduction

The validity of the conclusions drawn from any research rests, in large part, upon the scientific adequacy of the methods by which the data are collected and analyzed. But the use of standard, proven methods does not in itself guarantee the production of valid, significant results. Much social science research has been done which is methodologically impeccable but theoretically and pragmatically insignificant because methods have been used mechanically and indiscriminately. Whatever the subject, methods should be carefully selected and skillfully adapted to meet the requirements of the particular area of research.

Basically, the methodological problems of field studies in disasters are those common to any effort to conduct scientifically valid field studies in the behavioral sciences. The disaster situation itself, however, creates special or aggravated problems for field studies. It is the purpose of this report to introduce the scientist who has not previously done disaster research and the persons who might use the results of his research to these problems. It is intended to be, throughout, an introduction. There has been no attempt to present specific, detailed solutions to technical problems. An attempt has been made, however, to point out where problems lie and where adaptations of methods may be required. The competent investigator will take it from there. Indeed, the writer and the Committee on Disaster Studies will be disappointed if the ingenuity and wisdom of new and "veteran" disaster researchers do not make the present discussion meet what Dr. Chapman has aptly called "the happy fate of rapid obsolescence."¹

Since this is an introduction, it is worthwhile to sketch briefly some introductory concepts and definitions concerning disaster. Many events are disastrous to the individuals or groups involved. Disaster research, however, has been primarily concerned with events which threaten and disrupt communities or larger social units. This is the kind of disaster to which the present report is addressed. While these events may be defined in many different ways, depending upon the interest of the investigator, any disaster basically involves a disruption of the social context in which the individual functions. Deaths, injuries, destruction of property and disruption of communications all acquire importance principally as departures from

1. Dwight W. Chapman, "Introduction," The Journal of Social Issues, X (1954), 4.

the pattern of normal expectations upon which the individual builds up his actions from minute to minute. The central problem for research becomes, "What factors produce what degrees of disruption in this social context, and how do individuals and groups behave in the face of this disruption?"²

Several kinds of disasters can be distinguished on a functional basis, according to time and spatial characteristics and according to the type of agent causing the disaster. Most research has been conducted on sudden, single-impact disasters, such as tornadoes, flash floods, or a single atom bomb. The discussions in this report are heavily colored by this fact. Many of the problems pointed out apply most directly to this type of disaster. There are other types, however, notably serial-impact disasters, such as a series of conventional bombings or a series of earthquakes, and prolonged-impact disasters, such as epidemics or biological warfare attacks.

Functional time-phases and spatial zones have been identified in most disaster studies and these concepts prove highly useful in ordering the data. The reader who is interested in disaster, either from a research or an administrative point of view, will do well to acquaint himself fully with these concepts.³ In the present report, the following concepts are utilized:

2. Lewis M. Killian, "Some Accomplishments and Some Needs in Disaster Study," The Journal of Social Issues, X (1954), 7. This language is "sociological" but the writer believes and intends that it embrace the interests of the psychologist, psychiatrist, social psychologist, anthropologist, political scientist, economist and administrator as fully as those of the sociologist.

3. J. W. Powell, J. F. Rayner, and J. E. Finesinger, "Responses to Disaster in American Cultural Groups," in Symposium on Stress (Washington, D. C.: Walter Reed Army Medical Center, Army Medical Service Graduate School, 1953), 174-193. John W. Powell, "An Introduction to the Natural History of Disaster" (Unpublished report, The Psychiatric Research Institute, University of Maryland, 1954). A. F. C. Wallace, Human Behavior in Extreme Situations: A Survey of the Literature and Suggestions for Further Research (Disaster Study No. 1, Committee on Disaster Studies [Washington: National Academy of Sciences-National Research Council, 1956]). A. F. C. Wallace, Tornado in Worcester: An Exploratory Study of Individual and Community Behavior in an Extreme Situation, (Disaster Study No. 3, Committee on Disaster Studies [Washington: National Academy of Sciences-National Research Council, 1956]). Wallace's Tornado in Worcester will give the reader a good picture of the actual situation in a tornado disaster and will help to make the discussions which follow more meaningful.

Time phases: (1) warning -- the period during which information is available about a probable danger, but before the danger has become immediate, personal and physically perceivable; (2) impact -- the period during which the destructive agent is actually at work; (3) emergency -- the post-impact periods during which rescue, first-aid, emergency medical care, and other emergency tasks are performed; (4) recovery -- the period which begins roughly as the emergency crisis passes and during which longer-term activities of reconstruction, rehabilitation, and recovery proceed.

Spatial zones - This report makes reference only to the Impact Zone. This, obviously, is the area where the danger and destruction occur. In many disasters, this can be divided into Total and Fringe Impact Zones. In some disasters, such as explosions and tornadoes, it is easy to define; in others, such as epidemics, it is harder to define. Beyond the Impact Zones, it is usually possible to distinguish a Filter Zone, where the flows of persons and goods in and out of the stricken area meet and where first-aid stations, traffic control points, and other functions tend to be located. Beyond this area, one can usually define zones of organized community aid and organized outside (extra-community) aid.

Some types of research related to disaster present no unusual methodological problems. For instance, the use of conventional ecological and demographic methods can lead to significant findings on evacuation problems.⁴ Standard sampling and attitude measurement techniques may require little adaptation for the investigation of attitudes towards the threat of disaster, disaster preparations, the operation of relief agencies, or other problems which can be studied before or after the event. It is in the analysis of significant psychological and sociological variables as they affect human behavior during the course and the immediate aftermath of a disaster that special methodological problems arise. The only way in which the effect of these variables can be analyzed completely is through field studies conducted during disasters or after they have occurred.⁵ Most of

4. See, for example, F. C. Ikle and H. V. Kincaid, Some Social Aspects of Wartime Evacuation of American Cities (Disaster Study No. 4, Committee on Disaster Studies [Washington: National Academy of Sciences-National Research Council, 1956]).

5. Obviously opportunity to do research during the event is much greater in prolonged-impact disasters.

the nascent body of theory about disaster behavior is based on such studies. Field studies continue to be one of the most fruitful and essential means of gathering disaster data. Even though they face formidable difficulties, these difficulties merely signify that the conditions under which disaster field studies must be conducted should be carefully analyzed and that the methods used should be adapted to these conditions.

This report is addressed specifically to problems of field studies in actual disasters. It does not pertain to laboratory studies, demographic and ecological studies using standard data, public opinion surveys in non-disaster communities, or other types of studies which may be made on problems related to disaster and which are important to the full development of this field of research. The report also does not deal with clinical or psychiatric studies, although such studies might be conducted by field interviewing of disaster-stricken communities.

Research in the Disaster Setting

There is no area of social research in which the scientist must operate with less freedom than in the field of disaster study. Controlled experiments, except with small scale, simulated models, are forbidden him. Since disasters are highly unpredictable, he rarely has the opportunity to select the locus of his study before the disaster has occurred. Usually the locus is determined for him by the unpredictable forces that produce disasters. Cases must be selected on the basis of the few variables that can be controlled, not in terms of the wide range of variables that it might be desirable to control. Insistence on the control of a large number of variables may lead to no research at all.

By the same token, disaster research is usually entirely post hoc. Time always presses upon the researcher, for the longer he takes to get into the field the more remote the disaster experience becomes for his subjects.

In a post hoc study of a disaster, the population is not in, and will never quite return to, its normal pre-disaster state. If a study is made soon after the disaster occurs, the spatial distribution of the population will be distorted. Many pre-disaster occupants of the affected area will have been displaced by destruction of their homes, while the area will be crowded with many people who are there temporarily, only because of the disaster. Later, the composition of the population will not be exactly what it was before the disaster and many potential subjects who were in the area during the disaster period will have dispersed. The fact that those who did not survive cannot tell their stories automatically makes one gap in data on survival behavior. Furthermore, any analysis of the demographic, socio-cultural and psychological characteristics of the population before

the disaster must be made retrospectively. In only a few fortunate cases will the investigator find that studies have previously been made in the right community or on the right subjects which are pertinent to his own research objectives.

The disaster experience leaves the people involved heavy laden with emotion and tensions. The great majority are intensely ego-involved in their experience. It is easy for the researcher to be affected by the drama and the tragedy which so strongly affect his subjects, so that interviewer bias can easily become a problem. It also raises forcefully the question of whether the interview responses of disaster victims may be especially subject to faulty memory and retrospective distortion and reconstruction.

In the light of all of these conditions under which disaster field studies are conducted, careful attention must be given to the design of the research, the selection of subjects, the collection of data in the field, and the analysis of the data.

Design of Research

Field studies of disasters have been made at various intervals of time after the event, but it is generally desirable that field work begin as soon after the moment of impact as feasible. This means that a specific research design must be crystallized hastily, with limited knowledge of the salient features of the situation.

If valid conclusions are to be produced, however, the process of designing research must start before the occurrence of any specific disaster which is to be studied. Significant additive contributions to knowledge of disaster phenomena are not likely to come from hastily designed, entirely ad hoc field studies. An essential part of designing the research is selecting the disaster that is to be studied.

The Problem of Scope and Specificity

Hypothesis-oriented research designs are desirable in disaster field studies, as they are in other areas of social science research, because they give order and precision to methods of measurement and data collection, because they give power and exactitude to analysis, and because they yield results which are additive and more subject to independent test by other investigators. The degree to which disaster field studies can be designed on the basis of hypotheses -- or, more properly, the degree of specificity of the hypotheses which can be formulated -- still varies, however, with the research topic and with the field circumstances. For some time to come, disaster studies will consist of two important parts -- the general, exploratory

work required for getting the history of the disaster, and the testing of well-defined, neatly formulated hypotheses through clearly foreseeable operations. In their haste to reach a high level of quantification and control, disaster researchers should not undervalue descriptive case studies, nor should they neglect the need for exploratory studies in problem areas upon which little empirical research has yet been done. The major portion of this report is devoted to delineating the problems which are encountered in executing both of these types of research.

For many subjects, upon which there are already considerable data and a reasonable conceptualization, such as panic flight, it should be possible to formulate operational, testable hypotheses and to plan in advance the procedures of data collection, measurement, and analysis by which the hypotheses will be tested.

In many areas, existing research data give the prospective investigator an idea of the dimensions of the problem and a pretty good notion of the most significant variables and interrelationships. He finds the data cloudy, however, with respect to just how these variables and relationships ought to be defined and measured and they leave him with the feeling that there are probably still important variables and relationships which have not been discovered.

This type of situation is still amenable to hypothesis-building, but in such a case the investigations should not and need not be limited to the testing of hypotheses which can be foreseen and operationally stated. Data should be collected and analyzed in such a way that new and unexpected relationships can be discerned and the possibility of identifying unforeseen variables is not excluded. No matter how "open-ended" his research design and his data-collecting procedures, however, the investigator will be selective to some extent and he must have some general assumptions or hypotheses to guide him in the search for new variables and relationships. These should be explicitly stated, both to protect the investigator against his own biases and preconceptions and to guide him in the search for significant data.⁶

6. There is probably no area of human behavior about which so many untested stereotypes and so much word-magic exist as the area of human behavior in disaster. Another thing that a scientist just beginning work in disaster will notice is a considerable semantical confusion about certain widely used terms. The term "panic," for example, is used by different writers, and sometimes the same writer, to mean a subjective feeling of fear or terror, bad judgment, inefficient behavior, acting too fast, not acting fast enough, blind flight, any kind of flight, paralysis, or a vague, global concept of

This attention to scope, or relative open-endedness, will usually mean in any specific study, that the investigator does not have the controls and data he needs to test his hypotheses as rigorously as he would like. In all likelihood, resources and means usually being limited, he has sacrificed some degree of precision and control to scope and open-endedness. He will then want to pull out what his data show him to be the most critical hypotheses and design a future project or projects to test them as rigorously as possible.

Exploratory Research -

When the investigator finds that there is very little information available on the disaster problem he wishes to study, he may well decide that his first step is an exploratory study to secure preliminary data and to increase his understanding of the problem in its disaster context. Even in the most unstructured of exploratory studies, however, the investigator has assumptions, or in a sense hypotheses, about what is relevant. His job in planning the exploratory study, therefore, is to make explicit his assumptions, not in terms of operationally stated hypotheses, but in terms of categories of relevant information which he will seek, the types of relationships he thinks he may find, and the types of hypotheses he hopes to be able to formulate when his data are analyzed.

One further point should be stated emphatically: no matter how narrow the interest and how well crystallized the design, every disaster field study should make provision for securing an accurate description of the overall situation and sequence of events. This is particularly important in disaster because situational variables are so often important in determining human behavior. The physical facts of the disaster -- when it struck, what was destroyed and damaged, casualties, conditions of routes of egress and ingress, and similar details should be established. The general sequence of events -- who was notified of the disaster and when, what rescue and relief forces and supplies arrived and when, what steps were taken to organize a coordinating body or directing authority, and similar factors -- should be

wild, animal-like behavior. Scientific investigators, though usually more specific in their definitions, also use the term "panic" to mean quite different things. The terms "shock," "looting," and other widely used terms connoting behavioral and emotional responses in disaster are used with different and sometimes undefined meanings. Since the person coming into disaster research inherits this confusion about terms, and possibly some of the common stereotypes, he needs to exercise special care in his definitions, descriptive categories, and other terminology, and he needs to be doubly careful about making his own assumptions and hidden hypotheses explicit.

discovered. Other data which should be secured will be readily apparent from a study of existing disaster research reports.

If this discussion has seemed "old hat" or "textbookish," the reader may wonder why it is repeated here. This has been done in an effort to emphasize what this writer and the Committee on Disaster Studies believe to be the greatest needs in disaster research, and the greatest weakness of much of the disaster research which has been done, namely, the needs to (1) select problems or problem areas more consciously and more carefully, with a greater attempt at foresight on their potential payoff as research topics, either pragmatically or theoretically, (2) become much more explicit about theoretical and empirical assumptions, whether the intended research is a highly refined project to test a limited number of hypotheses or a new exploratory study, and (3) formulate specific, testable hypotheses and design research projects specifically to test these hypotheses, but (4) not become exclusively devoted to the testing of hypotheses which can now be formulated operationally, because there is still much territory which is only vaguely charted.

The Problem of "Controls"

Disaster field studies are beset with one problem probably even more than most social science field studies. This is the difficulty in establishing controls over the variables investigated, either through experimental controls, statistical inference, or exhaustive depth study. In the next section we will mention the difficulty in finding stimulus situations which fit closely with the investigator's expectations. It is also frequently difficult to make the distinctions among responses and motivations of actors which one would desire. For example, a common phenomenon in disaster is the convergence of large numbers of outside persons on the disaster site. These persons come for different reasons -- for example, to seek relatives and learn of their welfare, to help in the rescue and relief, to "sightsee." The motivations of convergers change -- a person comes to stare and stays to help -- and their motivations are mixed -- a person has a compelling need to find out for himself whether his relatives have been harmed, but he also hopes that he can help them in some way. It would be of great importance, both practically and theoretically, to measure the changes in motivations and the relative strength of different motivations of convergers.

The flux of population in and around the disaster area makes it difficult for the investigator to apply techniques which he would normally think of to study such a problem. It will be shown in a later section how this problem of population flux and dislocation affects problems of sampling in disaster. Disaster research to date has succeeded in identifying motivations such as those mentioned above, but it has not yet generally progressed to the

stage of measuring their relative importance. This is one type of methodological problem which is presented, through this report, for solution in future investigations.

The problem of "controls" is implicit in much of the discussion to follow, especially in the sections on sampling and all of the discussion of research design. Here it is sufficient to point out the obvious fact that "controls" should be built into the basic design of the research if valid and convincing inferences are to be made about significant relationships among variables. In order that this fundamental problem may be made clear, one further illustration will be presented at this point.

One of the most useful and desirable results of disaster field studies will be a reliable and valid comparison of what forms of emergency rescue and relief organization are most effective. Such a comparison obviously requires reliable and valid methods of rating the actual effectiveness of different forms of organization. But what criteria can be used to rate or rank effectiveness of performance -- number of lives saved? number of dollars or amount of goods given in relief? speed of mobilization and performance of prescribed or assumed functions? effects on the population involved?

When the investigator has decided upon useful, reliable, and valid criteria for rating effectiveness of organizational performance -- which take account of the differences of functions prescribed to or assumed by the different organizations -- he has to find data which permit him to apply the criteria to the forms of organization being compared. He may find records on some aspects of performances, but not others. Relief agencies will usually have a record of the number of dollars and amount of goods given out, but it is unlikely that there will be reliable records of the number of injured and dead removed and handled by different organizations. In a group that rescues X number of persons, there may very likely be representatives of more than one organization and several volunteers. Who is to say how "credit" is prorated? Painstaking research may measure speed of mobilization of different organizations, but speed of performance of functions after mobilization is even more difficult to measure.

There is no reason to believe that these problems are insuperable. For instance, progress has been made by William H. Form and others at Michigan State College towards developing criteria for rating organizational performance.⁷ Yet it is quite clear that there is no easily accessible and measur-

7. W. H. Form, S. Nosow, G. P. Stone, and C. M. Westie, "Final Report on the Flint-Beecher Tornado" (Unpublished report, Social Research Service, Continuing Education Service, Michigan State College, 1954).

able output of disaster organizations which can be used as a dependent variable -- as, for example, can the production rate of industrial workers. As was indicated earlier in the present section, the same difficulties hold for the measurement of independent variables. This, then, is another root of the problem of "controls" and therefore of making valid inferences concerning significant relationships among variables in disaster.

Selecting the Event to be Studied

Having a research design prepared in advance does not mean that the investigator can rush into the field at the first news that a disaster is impending or has occurred, to apply a particular design mechanically.

One of the difficulties in determining whether a given disaster is the appropriate one to be studied is the difficulty of determining in advance whether the stimulus was sufficiently distinct and meaningful. In the winter of 1954, a large part of London was covered by a very heavy, black layer of smog, bringing sudden darkness. Newspapers reported that people had reacted excitedly. Preliminary investigation seemed to indicate that it was defined by many people as an unusual situation, not just another London fog. It therefore seemed an excellent opportunity to study people's reactions to a strange, ambiguous threat and a study was launched. The study itself, however, revealed that 52 per cent of the people interpreted the situation as a fog or smog. Fortunately, there were enough people who did define the situation as unfamiliar and threatening to make the study worthwhile, but this example does illustrate the difficulty of knowing, until the final results are in, whether the desired stimulus, as perceived by the subjects, did exist in a distinct way. One need have no doubt, of course, that a tornado creates danger and distress, but he may not know, prior to considerable investigation, what situations people were in with respect to entrapment and being cut off from escape. These are situational variables he must be concerned about if he is studying survival and escape behavior. Since it is desirable to commence field work as soon as possible after the disaster, it is sometimes unavoidable that the investigator take a chance that the stimulus situations will be as expected.

A preliminary reconnaissance of the disaster situation should always be made. This reconnaissance may be made by members of his own research staff or by reliable, scientifically trained colleagues who can reach the scene quickly. News reports, particularly early bulletins, cannot be relied on for they often present an incomplete, distorted picture of the situation.⁸

8. With respect to the London black smog episode referred to above, a newspaper story in the United States reported that "one of the world's biggest cities experienced a near mass panic." In a sample survey, one percent of the respondents reported themselves as having panicked and one percent stated

Hence they should be supplemented by interviews with a few key personnel who are believed to be in a position to hold authoritative, even if incomplete, information. City officials, the police, directors of relief activities and hospital directors are among the people likely to be fruitful as original sources. On the basis of this reconnaissance the director can decide if the disaster is actually of the type appropriate to his problem and whether it is feasible to follow his design in this particular situation.

Even after a disaster has been selected for study on this basis, it may be found that modifications of the design are necessary. For example, a preliminary reconnaissance of a coastal community which had been threatened by a hurricane indicated that the reactions of beach residents to official orders to evacuate could be studied. By the time field work was launched it was discovered this population, composed of transients, had changed almost completely since the hurricane threat. As a result, the study had to be done in an area containing a more stable population but one in which the warnings had been issued as advice rather than as orders to evacuate.

Attempts to adhere closely to a particular design may result also in long periods of waiting without any actual research being done. If the research team goes only into those situations which are appropriate to its plans, it may have to wait many months for the "right" kind of disaster to occur.

This problem can be alleviated if the researcher has several alternative research topics in which he is interested, with an appropriate design for each. With a broad range of pre-formulated problems, the researcher will more frequently find situations which offer opportunities for meaningful research and will still have some criteria by which to select his cases.

To illustrate, a research group might focus on several problems relating to leadership and social organization, including emergent leadership, the operations of pre-existing disaster plans, and the performance of formal leaders in a disaster emergency. On entering the disaster area for research they might find that a disaster plan reported to have been put into operation existed only on paper, and that formal leaders, such as civic officials would not cooperate in the research, so that a study of formal organizations would be unfeasible. They still might find an opportunity to study emergent leadership in rescue and relief activities, using subjects drawn in an area sample of the entire community.

that other people with them had panicked. "The Great London Blackout, A report to the Committee on Disaster Studies, National Research Council, Washington; of an enquiry into responses to unfamiliar stimuli" (Unpublished report, Institute of Community Studies, London, 1955).

Matching the Design and the Disaster

It may seem that the preceding discussion has placed the prospective disaster field investigator in a dilemma, first by urging pre-designed, hypothesis-oriented research and then by arguing that the occurrence of specific research problems and therefore the applicability of detailed research designs are unpredictable in disaster. It has been suggested as a solution that the investigator should (1) conduct a preliminary reconnaissance in a given disaster to determine if it provides the variables and the subjects he desires to study, and to determine if he can secure the necessary cooperation, and (2) formulate alternative topics for field investigation and general research designs appropriate to each, which can be adapted specifically in the field. The dilemma still remains, however, if either of these suggestions is carried too far. If the investigator waits until reconnaissance has revealed the ideal situation, he may never launch the investigation; if he develops too many alternative topics and plans, he may never succeed in developing more than a very general design. In either event -- while he conducts reconnaissance or while general plans are adapted -- time is lost in commencing the investigation.

In final analysis, the solution must be a practical one for each investigator, in terms of his own interests and resources. In general, it might be along the following line: The investigator should become thoroughly familiar with the existing disaster literature and data. He should think out how his research interest can be applied to different kinds of disasters and different situations within disasters. If he has a specific area of interest -- e.g., civil defense organization, spontaneous groups, leadership, medical care, communication, community organization, problem-solving behavior under stress, emotional reactions to traumatic experiences, evacuation, social change -- he should discover that most community disasters will allow him to study some of the variables and interrelationships in which he is interested. Combining competence in his own area of interest with information from previous disaster research, he can perhaps formulate a tentative, general theoretical model. This model will help him to specify the hypotheses which are likely to be testable in different kinds of disaster situations and suggest preliminary research designs to have ready for use. Under any circumstances, however, the investigator must expect to make some adaptation of his design in the field.

This strategy has not yet been tried in disaster research, so it can be illustrated only hypothetically.⁹ Let us assume, as a very crude example,

9. One study does provide an enlightening similarity, however. The Department of Anthropology and Sociology of Michigan State University is conducting

that the investigator is generally interested in communication research and theory and that he believes theoretical or pragmatic value should result from the study of communication in disaster. Study of disaster material will show him that communication problems are very different in different time phases of a disaster -- warning, impact, emergency, and recovery. It will show him further that communication problems of a given time period -- for example, warning -- vary with different types of disaster, such as epidemic, hurricane, and tornado. This is because of different time dimension and because different threats have to be communicated. He will see further that the communication problems vary in different disasters of the same type according to conditions (for example, the telecommunication system was or was not knocked out by the disaster) and according to conditioning factors such as previous experience (for example, the community has or has not experienced previous hurricanes). If he has a very specific research problem -- such as the relative effects of warning type A and warning type B upon populations which have not previously experienced floods -- then the kinds of differences between disasters which are cited above will be all important. If, however, he has a more general model and set of hypotheses about the effects of different kinds of warnings, communicated in different ways, to different kinds of populations, he can go into a wide variety of disasters and test some of his hypotheses. The same thing should be true for other phases of disaster communication, such as the mobilization and disposition of rescue and relief forces.

a long range study of cultural and social relationships and differences along national boundaries. The Mexico-United States border is one of those being studied. When a disastrous flood swept down the Rio Grande River in June 1954, the Michigan State University group, which had previously done field studies in disaster, immediately saw an unusual opportunity. Mexican and American towns on opposite sides of the river were being subjected to approximately the same disaster stimulus. Would there be differences in response associated with differences in culture and social structure? The investigators hypothesized that there would be such differences, that basic differences in social structure and cultural value orientations would be manifested through differences in the communication media through which persons and families learned of the flood danger, in the nature of groups formed for evacuation, rescue and rehabilitation, and in other responses to the disaster situation. They designed and carried out a study to investigate these, and other, hypotheses. See Roy A. Clifford, The Rio Grande Flood: A Comparative Study of Border Communities in Disaster (Disaster Study No. 7, Committee on Disaster Studies [Washington, D. C.: National Academy of Sciences-National Research Council, 1956]). While this study does not illustrate our suggestion of pre-planned alternatives for disaster research, it does illustrate how a pre-existing interest and competence in a special area of research can be readily translated into hypothesis-oriented research in disaster.

The Selection of Subjects

Having decided that a particular disaster is suitable for the study of some of the variables in which he is interested, the researcher faces the problem of selecting subjects from a vaguely defined, more or less disorganized population. The type of problem he chooses to study has much to do with the method by which the subjects are selected. When the population is small and easily accessible, the universe may be studied. In some instances a probability sample may be used. In yet other cases, subjects may be selected for certain desired characteristics with no randomization.

Selecting the Subjects to Fit the Design

Certain precautions must be observed to insure that the subjects selected are adequate for testing the hypotheses of the study. This requires attention to the physical and ecological situation in the disaster and foresight in sampling the sub-populations which logically can be expected to have been involved in the actions or to have been subject to the variables being studied. These logical expectations, to some extent, can be checked empirically by preliminary interviewing before the final sample is drawn.

One research team set out to investigate the reactions of a town's population to a rumor that an upstream dam had burst. It was decided that a random sample of city residents, drawn from a complete and up-to-date city register, was the best method of sampling in this case. Preliminary interviewing, however, showed that a small proportion of the city's residences had actually been flooded a few days previously and that this previous experience had probably affected their occupants' reactions to the rumor. The sampling rate in the flooded area of the town was therefore increased to insure sufficient cases for cross-tabulations on this important variable. New hypotheses and new questions for the schedule were also formulated, illustrating the previous point about the need to make adaptations in the field.

Another hypothetical example of this problem, adapted from experience in an actual study, is as follows: It was desired to compare the amount of self-help and help by immediate family members with help by non-family members during the emergency period in the two communities. Area samples were drawn for the total impact areas and a narrow fringe next to the total impact area in each community. In Community A, the area sampled included approximately 85 per cent of the inhabited area and a corresponding proportion of the population; in Community B, approximately 33 per cent of the inhabited area and a corresponding proportion of the population were in the sampled area. The results showed clearly that more people received help from non-family members in Community B than in Community A. However, before this

difference could be attributed to other differences between the communities, it was necessary to know whether it could be accounted for by the different physical situations -- i.e., in Community A, only 15 per cent of the population was not directly involved in the impact area; in Community B, 67 per cent of the population was not involved in the impact. Those not caught in the impact could have been more free from concern for missing family members, and more able physically to go to the aid of fellow citizens. The sample, representing total and fringe Impact Zone victims was of little help in solving this problem. One could find out, on a statistically reliable basis, whom victims reported helping and being helped by, but one could not investigate the opportunities to help and the problems of giving help, as these would be reported by non-victims.

Sometimes the physical and ecological facts of the disaster may make such problems incapable of any neat solution, but the investigator should always at least consider the possible need to increase his sampling rate in sub-samples to correct ecological or situational distortions in the sample and provide sufficient cases for analysis of important variables.

Difficulties in Sampling

Probability sampling has been used less frequently in disaster research than in other social science field studies. This is largely because the conditions described above make it difficult to define, locate, and reach the universe to be sampled. In spite of the problems of sampling in a disaster area, however, probability sampling should be used as fully as possible whenever conclusions are to be stated in quantitative terms, for generalization to an entire community or other known population. This is particularly true when the findings relate to the frequency and distribution of various types of individual behavior, attitudes, or emotional reactions. More frequent use of rigorous sampling procedures is needed before the knowledge now existing about the types of behaviors and events which occur in disaster can be translated into knowledge about the frequency with which they occur under specified conditions.

For some problems, such as the reactions of people within the Impact Zone, it may be sufficient to sample within the disaster-stricken community. If the focus is on convergence behavior, participation in rescue activities, or other activities in which persons from zones beyond the Impact Zone are likely to be involved, it may be necessary to sample in surrounding areas. Even then it should not be assumed that the total population involved in such activities is included in the area from which the sample is drawn, for some participants may come from very distant points.

The sample selection should take into account the differential experi-

ences of subjects in different zones. Subjects in areas outside the Impact Zone have been in a situation very different from that experienced by those within it. Even though they may be residents of the same community, the occupants of the different zones should, in most cases, be treated as separate populations, making it necessary to draw separate samples. In any event, the sampling techniques should always permit the separation of respondents on the basis of spatial zones.

Where physical destruction or evacuation have resulted in displacement of portions of the pre-disaster population, special problems arise. In this case, it is necessary to reconstruct the composition of the pre-disaster population from available records. For urban areas, land-use maps obtained from city engineers or from real estate firms provide a fairly accurate indication of where residences were located before impact. On the basis of this information, a sample of blocks may be drawn and, in turn, a sample of every nth household may be drawn from these blocks. At this point the aid of local informants must be relied upon. Their assistance will be needed in tracing the present, post-disaster location of subjects who have been displaced. Obviously, the time and travel required for actually reaching subjects selected in this manner are great.

For rural areas, county highway maps generally indicate the location of residential structures prior to impact. Populated rural areas may be broken into identifiable segments using roads and other landmarks as boundaries. Systematic sampling of segments, and of households within segments, may follow.

Occasionally it may be possible to obtain a pre-list or even a sample of the pre-disaster population from commercial or governmental research agencies. There are many areas in the United States for which such agencies already have drawn samples.

When adequate information is available, the sample of blocks may be stratified for severity of destruction, distance from point of impact, and other disaster-related variables. If pre-disaster studies of the social and demographic characteristics of an area are available, stratification may be introduced for such characteristics as sex or age composition, or socio-economic class level.

This procedure may be followed when the population to which conclusions are to be generalized is contained entirely within the area sampled, and when no other population is included within the area. Sampling becomes more difficult when a special population, not assumed to be randomly distributed throughout some spatially defined universe, is to be studied. For instance, the problem selected may require that the population be limited to persons

who were in the Impact Zone, regardless of where they came from, or to persons who participated in certain phases of disaster operations. Here sampling by standard probability procedures is feasible only if, with the aid of records or informants, a nearly complete pre-list of the relevant population can be made. Sometimes a pre-list can be made up by use of a preliminary questionnaire survey. The questionnaires may be distributed to a larger population believed to include the totality of the desired subject population, the pre-list then being obtained from the returned questionnaires. Completeness of the pre-list obviously depends upon a high rate of return of questionnaires.

Selecting Subjects for Studies of Group Processes

Data obtained from a probability sample of the population may reveal the frequency of various types of individual or group reactions, but unless the sample is very large (or unless a very large proportion of the population participated in the types of groups being studied, which is unlikely unless the family is the object of study) such a sample gives insufficient insight into group structure and process. A feature of disasters having great theoretical and practical significance is the emergence of new groups and the transformation of the structure and functions of pre-existing groups. To study the dynamics of group formation, structuring, and behavior in a disaster situation requires a different method of selection of subjects.

Whatever the goal of research on disaster groups, the first step is the identification by any means available of single members of various groups of the type to be studied -- spontaneous rescue teams, for example. From these initially selected subjects, the names and addresses of other members of their group and of members of other groups may be obtained as "leads" for the selection of additional subjects. Then, if the goal is a case study of the structure and function of one or a few groups, such leads are followed until the entire membership of the group or groups to be studied is located, or until all leads are exhausted. If the goal is to develop a typology of groups or to compare different types, such leads are followed until no new types of groups are identified. In this case, the group members who are located serve as informants reporting on the formation and operation of their groups rather than or as well as respondents.

This is, obviously, a time-consuming process. In spite of its limitations, however, it must be followed if the processes of social disorganization and reorganization are to be fully understood.

Selecting Informants -- Sampling "Points of Observation"

Most field studies include a reconstruction of the natural history of

the disaster, or of certain phases of it. In the collection of data for this history the subject has a dual role. He is a respondent, reporting his own reactions, and also an informant, reporting his observations of what went on around him, including the behavior of other people. Informants must be selected as carefully and as systematically as are respondents. Bias in their selection may lead to a grossly inaccurate picture of what took place. In order to maximize accuracy, a number of informants representative of populations which viewed the disaster from different vantage points should be used. Position with reference to the Impact Zone, time of entry into the disaster area, degree of involvement, professional training and orientation, are among the factors which should be considered in selecting informants. In the confusion of a disaster, the portion of the total situation which any one observer witnesses is very small and there is likely to be too much distortion of his perception. The accounts of many differently placed informants serve to complete the gestalt; they also constitute checks on each other.

In studying formally structured organizations, it is important to secure reports of observations by (1) persons at different levels in the hierarchy of the same organization, (2) persons at corresponding levels in different organizations, (3) persons in any organization which had higher or wider jurisdiction or coordinating functions, (4) persons not in an organization who were (a) in a position to observe its work, (b) recipients of its services.

A matrix of positions, units, or locations appropriate to the particular disaster, community, and organizations involved can be constructed by the investigator to give system and greater surety to his attempts at securing the total picture and "cross-checking." Such a matrix, properly constructed, provides a sample of "points of observation (or participation)," of opinions, or both. This is not intended to imply, of course, that probability samples of members of organizations cannot or should not be used in the study of organizational behavior.

This procedure of constructing a "sample" of "points of observation" must apply to many aspects of the study of group, collective, and community behavior in disaster. Sometimes, for the reasons given above, the investigator cannot define statistically the universe to be sampled. Some of the basic units of investigation are likely to be events or chains of events, rather than the distribution of attitudes, emotional reactions, or behaviors in a population. Here his concern is to obtain the most accurate reconstruction of the event possible and this need may best be served by tracing down and interviewing those persons who were participants in or witnesses to that event. His concern is sometimes with a particular decision -- for example a decision to form a disaster committee representing different agencies --

or a particular point in a process -- for example, the origin of a rumor. There is no sample of unique events, and the general population does not contain a random sample of witnesses or participants.

Much important data, therefore, has to be gotten through what Wallace has called "jig-saw puzzle" research methods.¹⁰ Sometimes the jig-saw puzzle never falls completely into place -- different observers or participants with an equally good a priori chance to be correct give irreconcilable reports, or the same informant gives contradictory reports in succeeding interviews. Often, however, patient investigation will yield at least a "most probable" account. The suggestion here is that this type of investigation should be planned as carefully as possible, on the basis of a matrix of likely points of observation and participation. Just because it cannot be guided by the precise rules of probability does not mean it must be pursued willy-nilly. The investigator can first exhaust the possible points of observation and participation logically: What persons (or positions) would one logically expect to have witnessed or participated in an event? This picture can then be modified empirically as he asks "What other persons were here when it happened?" "Who else did you talk to about the decision?" etc.

Reports of discrete events or trends are not only a significant part of the field worker's data, they also are one of his problems. Every competent research worker is alert to the need of verifying reports of particular happenings which have an important place in his analysis. It is particularly important to verify such reports in disaster because a certain number of stories always gain wide circulation, credence, and durability. They are dramatic and, if accurate, they are often highly informative about human behavior and the course of events. In articles on the Texas City disaster, one is very likely to find a statement to the effect that many people were packed around the docks, watching the ship burn following the first explosion. They were there, so the statement goes, when the second explosion occurred and the number of casualties was greatly increased as a result. Although this story has gained wide credence and is frequently cited as an important illustration of human behavior in disaster, later investigation by a trained, objective research team seems to dispute it entirely -- there were very few people on the docks at the time of the second explosion. The only available information on an important problem of human behavior in disaster may be an unverified report from a particular disaster. Such an account, if true, might fill a significant gap in existing data. Under these conditions, the temptation to accept and repeat the account without verification is great, even for research workers.

10. Wallace, Human Behavior in Extreme Situations, op. cit., (3).

Collection of Data

Careful selection of subjects is of little avail unless the data obtained from them are relatively free from bias and are in a form which permits systematic analysis. Experience has shown that the deep emotional involvement of disaster subjects in their experiences and the confusion of the events of the disaster creates special problems of data collection.

Securing Cooperation of Subjects

Research teams have achieved great success in getting the cooperation of disaster populations. To gain such success, researchers must take cognizance of the emotional state of their subjects. People who have experienced a disaster have many sensitivities about their experiences. Particularly during the period shortly after the disaster, they may object to any study which is perceived as exploiting their tribulations for theoretical, scientific purposes. They want to be convinced that the research will "do somebody some good." Most victims are likely to resent any implication that they have "psychological problems" or, worse, that they might need psychiatric treatment. Leaders, particularly formal leaders, may be defensive about the way in which they played their roles during the disaster. Since many investigations of disasters are made in connection with insurance claims or law suits, people may have an initial suspicion of, and resistance to, any sort of fact-finding. For some, their experiences may have been so disturbing that the interviewer must overcome an initial reluctance to discuss them.

It is easy to get the cooperation of subjects when they are approached tactfully, in a way that will not be offensive or threatening. Extensive explanation of the purpose of the research and explicit identification of the sponsors are sometimes necessary. Cooperation is maximized if subjects can be convinced that the research has an immediate, practical purpose and will contribute to the alleviation of the effects of future disasters. It is particularly important in disaster research to avoid offending any subject or giving rise to misconceptions as to the purpose. Group cohesion tends to be heightened following a disaster, and negative reactions evoked in even one subject are likely to be reflected throughout the community in a very short time. Even if there is no such reluctance, the interviewer has a duty to be especially considerate of the psychological well-being of subjects who have experienced serious injuries, of those who are bereaved, and of children.

Whereas subjects are almost always cooperative when properly approached, officials, especially those who are in a position to be sensitive to public opinion, will sometimes be afraid that interviewing people will "upset them" and impose barriers to interviewing. In a study of an epidemic, officials

in three communities out of six communities approached refused to cooperate in the research on the grounds that the subjects would be disturbed. When the study was made, however, only 2.2 per cent of the persons in the sample refused to be interviewed and the experienced field director described the public cooperation as "terrific." This brings up the problem of gaining entree to the community, which will be discussed in a later section.

Questionnaires

Perhaps it is because of the need for such a careful approach to the subjects that questionnaires, mailed or left with subjects, have been little used in disaster field studies. The questionnaire method is inherently more impersonal than is the interview, which permits much more interaction between interviewer and subject. There is no reason, however, why questionnaires should not be used more frequently, if the following conditions are present:

- 1) A clear, convincing covering statement indicating the sponsorship, the purpose, and the possible significance of the research accompanies the questionnaire.
- 2) The research objective is specific enough to permit the requisite data to be obtained with a brief instrument consisting of limited-choice questions.
- 3) The sample, or the entire population, can be reached more easily, efficiently, and quickly through the distribution of questionnaires than through personal interviews.

The last condition may be met if the population under study is, in some sense, a "captive population." The students in a school, the working force of a plant, or evacuees in a shelter area can sometimes be assembled for mass administration of a questionnaire. It is much more difficult, if possible at all, to reach a community-wide sample with questionnaires and secure adequate returns.

Interviewing in Disaster Research

The method which has been most widely used in disaster field studies is the personal interview. In this field as in others, effective interviewing depends on three factors:

- 1) Effectiveness of the schedule or other interview plan.
- 2) Training and skill of the interviewers.
- 3) Recording of the data.

Unless the research topic is very narrow and specific, the schedule and the questions which compose it should not be rigidly structured. The extensive use of open-ended questions is usually desirable. The experiences of disaster victims usually contain many detailed incidents of which the subject's recollection may be comprehensive but somewhat disorganized. His reactions may have many nuances, some of which are revealed in fugitive, oblique remarks. The use of limited-choice, direct questions may obscure some of these significant details. Furthermore, the subject may find it difficult to describe his experiences and reactions in precise terms. He must be given freedom to try out different responses as he gropes for one that satisfactorily expresses the thing he is trying to convey.

Theoretically, of course, it is desirable that questions become more structured as investigators formulate hypotheses capable of quantitative testing. In addition, it should not be forgotten that the coding of open-ended questions for quantitative analysis is immensely more difficult, expensive, and subject to coder bias. As disaster researchers complete thorough exploratory and depth studies of various topics, one would expect greater use of structured, limited-choice questions. On the other hand, some disaster researchers feel that, due to the nature of the interview with disaster victims and the interviewee-interviewer relationship, it will never be possible to dispense entirely with open-ended questions. This condition would be expected to vary with the length of time intervening between the disaster and the interview, the degree of personal involvement and trauma of the respondent, and the questions being asked. It has already been shown that limited-choice questions can be used successfully in less violent kinds of disasters, such as epidemics. Determination of the best use of highly structured interviews in violent disasters awaits further experience and experimentation, however. In any event, the unstructured interview is the one more subject to special problems in disaster and many of the problems discussed below will arise, no matter how structured the interview schedule.

The use of open-ended questions requires flexibility of the order in which questions are asked.¹¹ When rapport has been established, responses may flow easily in a rich, narrative form. A greater wealth of data may be obtained by letting the subject verbalize freely, structuring his own answers, than can be gotten by holding him to a set pattern of response. Affect may be more freely expressed if he is permitted to "warm up" to his

11. The discussion of interviewing pertains to a field study in which some type of schedule or some form of structure is used in the interview to seek answers to pre-determined questions. The reader will see that we are not dealing with the very non-directive, clinical type of interview which would be required for some kinds of studies.

subject and give vent to his feelings. But if answers are permitted to flow in this unstructured fashion, frequent probing questions must be used to insure complete, systematic coverage of the questions in the schedule. While interviewers should improvise some of these probing questions, the types of probing questions that may be required should be identified in advance and included in the schedule whenever possible.

Various devices have been employed to maximize freedom and flexibility in the interview while insuring completeness. Questions of the type described above may be asked directly from a printed schedule on which the answers are to be recorded. If responses are recorded in note form, to be expanded and organized later, a list of questions or even cues to questions may be used for reference by the interviewer. In one disaster study a single "word," the letters of which suggested areas for questioning, was memorized by the interviewers as a mnemonic device.¹²

This sort of interviewing requires careful training of the interviewers. It permits numerous digressions by the subject, so the interviewer must become skillful in bringing him back to the relevant theme without destroying rapport. He must learn to keep himself from being sidetracked into irrelevant areas of discussion. He must be alert to indications that the respondent is on the verge of bringing out emotionally-toned, hard-to-verbalize material. If it seems that this is about to occur, the interviewer should pause and allow the subject to structure his answers in his own way and to formulate them at his own speed. He should be especially wary of asking a new question at such a time, as this may divert the respondent from his difficult struggle to express that which it is painful to talk about. He must guard against his own tendency to block or divert the respondent when the latter begins to verbalize material which is painful or anxiety-provoking to him, the interviewer. Review of disaster interview protocols reveals clear-cut instances of this very human mistake by well-trained interviewers.

The interviewer must be prepared to listen to, and even to probe, responses which are gruesome and tragic, in spite of the affect which they arouse in him. At times he may find himself performing a therapeutic func-

12. The mnemonic device was developed by Michigan State University investigators for use in a study of spontaneous rescue groups. The device employed was GLIRCS, representing respectively: (1) spontaneous rescue Groupings; (2) Loyalties activated by the disaster; (3) consequences of the disaster for the informant's Identification with his community; (4) Role conflicts; (5) consequences of the disaster for Community solidarity; and, (6) consequences of the disaster for social Stratification. "Preliminary Progress Report of the Flint-Beecher Tornado" (Unpublished report, Continuing Education Service, Social Research Service, Michigan State College, N. D.).

tion for the subject who needs to ventilate his feelings about traumatic experiences. In such cases he must combine the role of the permissive, sympathetic listener with that of the efficient interrogator. The greatest danger is not that the interviewer will appear unsympathetic to the respondent but that he will become so identified with him that he drops the role of scientific observer. While he should evince signs of sympathy he should maintain within himself the attitude of scientific observer. Few interviewers in field studies will be qualified psychotherapists. The interviewer must not ever allow himself to fall or be drawn into a therapeutic role for which he is not qualified. Amateurs can do harm. This is not to deny that well-conducted interviews with disaster victims do sometimes have therapeutic effects. The thing the interviewer must be trained to do is to recognize when the subject is coming to depend upon him as a therapist and to avoid this happening. Disaster field studies, like many other field studies, have almost always involved just one interview with each respondent. When this is the case, even the interviewer who is a qualified psychotherapist must remember that he will not have the opportunity to help respondents with emotional problems through a series of interviews.

In spite of all these sources of interference, the interviewer still must give sufficient structure and direction to the interview to produce a coherent protocol in which all relevant questions are covered. In extreme cases, interviewers have become so emotionally involved that the interview becomes a medium for the interviewer to ventilate his own feelings. In one interview, the interviewer persisted in asking such questions as: "Everybody has just been wonderful, everybody has just pitched in together, haven't they?" The respondent persisted in giving such answers as "yes" and "no."

Supervision of Interviews

This type of interviewing situation demands careful attention to supervision and quality control throughout the study. Even highly trained and skillful interviewers will often need advice and supervision in adapting to the disaster interview situation. If it is at all possible, the initial one or two interviews of each interviewer should be tape recorded. The research supervisor should go over these carefully with the interviewers, correcting faults and advising on pitfalls. With a group unexperienced in disaster interviewing, the supervisor may have to decide that some interviewers cannot interview skillfully in a disaster situation, even though they may be very good in other situations. Checking of tapes, or at least protocols or notes, should continue throughout the study. The supervisor should continue the training process and the group of interviewers should meet to discuss their problems. The need for supervision and quality control seems particularly great in disaster because the dramatic nature of the material and the ease of becoming emotionally involved with it can cause even

well-trained interviewers to develop stereotypes and biases in the course of early interviews which they then introduce systematically into all their future interviews.

As was indicated in the discussion of the selection of subjects, people who were in different spatial zones at the time of impact constitute different populations. Interviewers should be aware of the differences they may find in subjects from the various zones. Respondents in non-impact areas usually are not so highly motivated to "tell their story" as are those from impact areas. It is more difficult to make them see the value of data they may provide. In fact, the disaster is likely to have a meaning for these people which is quite different from that which it holds for those who are in the impact zones. Interviewers must take into account this difference of perspective in justifying the interview, stating the questions, probing, and interpreting the answers.

Recording Interviews

This type of interviewing demands careful, skillful recording. No matter how they are recorded, disaster interviews are likely to contain a mass of detailed information out of which must be winnowed the data that are relevant and usable. Unless highly-structured, limited-choice questions are used exclusively, some content analysis is necessary. Since a flexible schedule and open-ended questions permit the respondent to structure his own answers, there is always a problem of organizing the data for systematic analysis. Tape-recording of interviews provides the greatest wealth of faithfully recorded data.

Tape recorders have been used successfully in several field studies. They have not been found to inhibit the subject or interfere with the establishment of rapport. On the other hand, they free the interviewer from note-taking and make possible easy, uninterrupted interaction between him and the respondent. The most serious limitation on the use of tape records is the problem of analysis. Transcription, checking, organization, and coding of the mass of data so obtained can be costly and time-consuming. Sometimes budgets and time-schedules do not permit the use of this method. One research organization which tape-recorded several hundred disaster interviews found that it cost an average of about \$25 to transcribe and edit each one-hour interview. Translated into time units, it took six hours of typing and three hours of editing time for each hour of tape.

A much cheaper, generally more feasible method of recording is through note-taking. Usually notes may be taken during the interview, to be expanded soon after its conclusion. If a subject is obviously disturbed or inhibited by note-taking, it may be necessary to reconstruct the interview from memory immediately upon completion of the interview. The schedule or

mnemonic device aids in this reconstruction.

Even when notes may be taken during the interview, the free flow of questions and responses is somewhat impeded and much material is inevitably lost. If interviewers can work in pairs, with one taking notes while the other conducts the interview, more content can be recorded by the pair than by a single interviewer.

Even more serious than the loss of material is the effect of interviewer bias on the retention or loss of content. What is retained or lost is of greater consequence than how much is retained. Only the interviewer himself can guard against this deficiency, since the completed notes provide no way of completely ascertaining the effects of his biases. Interviewers must be cautioned and re-cautioned against retaining only the data which support the hypotheses of the research design. Supervisors must be alert for indications of the structuring of data in terms of some hunch which may occur to an individual field worker. When an interviewer follows such hunches too assiduously, his data not only reflect this bias but also become less comparable to the data of other interviewers. An obvious safeguard is to insist that interviewers write down their own questions and probes.

The complete interview protocol should be written up from the field notes as soon after completion of the interview as is possible, and certainly on the same day. While time schedules do not always permit it, the protocol should be completed before other interviews intervene. Otherwise data may be transposed from one interview to another. If several interviews must be conducted consecutively, it is essential that the field notes from each be edited and organized immediately after each interview.

In most disaster research interviews, it is desirable that as much material be recorded verbatim as is possible. This is especially true, of course, if emotional responses are being studied. It is also advantageous to have the data recorded in the order in which they were obtained, even though this does not correspond to the schedule or the topical outline. The data can be reorganized in terms of a schedule, a topical outline or a code during analysis, but the analyst should be able to see the context from which each item was drawn.

The Use of Projective Tests

Very little use has been made of projective tests in disaster research, but it is believed that they would be of value in some types of investigations. If the influence of personality variables on individual reactions to disaster is to be explored more thoroughly than it has been in the past, techniques for employing such tests in disaster research must be developed. Projective tests also promise to be useful in the study of children's reactions. They

might also disclose extreme emotional reactions of which adult subjects are unaware and which they are unable to verbalize.

There are both methodological and theoretical problems involved in the use of projective tests. A practical limitation is that most such tests require a relatively long time for administration. Careful scheduling of the tests and the whole-hearted cooperation of the subjects are needed. It may be somewhat more difficult to convince subjects that the research has some practical significance than it is when an ordinary interview is to be obtained. Theoretical problems arise from the nature of projective techniques themselves. Research is needed to ascertain to what extent results of tests administered after a disaster reflect stable, pre-existing personality characteristics rather than reactions to the disaster experience itself. There is an unresolved question as to whether facets of personality revealed by the tests should be treated as independent or as dependent variables vis-a-vis disaster experiences and reactions.

The study of personality variables in relation to reactions to disaster should not be based on the use of projective techniques alone. These techniques are recommended as a supplement to direct methods of personality study. Gordon Allport has pointed out that projective techniques frequently fail to show dominant motivations in normally balanced persons, and that on the basis of projective tests alone the research may be unable to distinguish a well-integrated personality from one that is not well-integrated.¹³

Sociometric Techniques

Little use has been made of formal sociometric techniques in disaster studies. One reason for this is the essentially transitory nature of group structures during the course of a disaster. While there is little chance that sociometric studies can be done both before and after a violent disaster, many opportunities are offered for the study of group structure and interpersonal relations at various periods after impact. It has often been hypothesized that social structures undergo dramatic changes during the early periods of a disaster but return to something closely approximating the pre-disaster state later. Sociometric techniques are well-fitted for the testing of such an hypothesis, with the group structures revealed by them at various times being used as a dependent variable. In some instances, it might be possible to use sociometric data as an independent variable, relating group structure and lines of influence to such things as rumor transmission or leadership.

13. Gordon W. Allport, "The Trend in Motivational Theory," American Journal of Orthopsychiatry, XXIII (1953), 111.

The Use of Documents

Documents constitute an important source of data in the study of disaster, but they must be used with caution. They are most useful when treated as sources of data supplementing first-hand data collected from the subjects themselves.

Newspaper accounts of a disaster are one of the most accessible but often least valid documentary sources. Because of the many uncontrolled biases of reporters and editors, particularly their tendency to overemphasize the dramatic, newspaper stories cannot substitute for systematic, controlled field studies. Even accounts which answer specifically the newsman's questions, "Who, What, When, Where and Why?" must be checked for accuracy, for many errors are made under the pressure of disaster conditions. Yet news stories are useful, particularly in the early stages of a study, for the general, though tentative, description of the disaster which they provide. Both news and editorial columns are more valuable as sources of data on the role of mass communications. They record the official pronouncements of public officials; they reveal the reactions of a potentially influential opinion leader, the editor, to various stages of the disaster and to specific, disaster-related events. They are an important variable affecting individual and collective reactions during the emergency and recovery periods, and they often reflect or report rumors which arise during the disaster. For instance, early, exaggerated estimates of casualties are often reported in newspapers even though they may be corrected later. A good indication of the accuracy and efficiency of communications at various stages of a disaster may be found in news columns.

Another type of document with great utility is the tape recording of broadcasts during an emergency which a radio station may keep. Content analysis of these recordings may reveal much about the content of communications at various stages. Such records often provide incontrovertible evidence of the official pronouncements, the orders, the warnings, and the requests for aid which are broadcast at the behest of various agencies or officials. These materials are also valuable for revealing the biases and distortions introduced by mass communications agencies themselves.

A similar picture of the development of the disaster through time as perceived by certain people can be obtained from the logs, taped records, or teletype sheets of agencies which are in communications nets, such as the police or the American National Red Cross. There is a danger in the use of official message records, however, in that they are likely to represent only a small segment of the total information communicated in disaster.

Although the bias of the writers must be kept in mind, use may be made of official records and reports of operations prepared by public and private

organizations. These reveal something of what the agency did and sometimes even more about its needs for justification and defense of its operations. Comparison of the reports of different agencies may provide important clues to inter-agency cooperation and conflicts.

Researchers should always make a careful search for documents which provide background data on the disaster population. These may include reports of demographic, economic, or sociological studies conducted before the disaster occurred. Occasionally it may be found that personality studies have been made before the disaster using some portion of the disaster population as subjects. If available, the data from such studies provide an excellent starting point for the analysis of the relation of personality factors to reactions to disaster.

Other documents which may be useful, if available, include:

Tape recorded, on-the-scene interviews conducted by reporters for radio stations.

Personal documents, such as diaries, and memoirs of survivors.

Letters received by agencies and officials, such as the letters which often accompany donations to relief funds.

Police files.

Building permits and other indices of economic activity.

Reports of surveys and investigations made by other agencies, such as the Army Engineers or insurance underwriters' laboratories.

In conclusion, documents are never adequate alone as sources of data for a comprehensive study of a disaster. They may be adequate for certain types of research, such as the study of mass communications. In all types of disaster research documents are a valuable adjunct to data collected first-hand.

Timing and the Problem of Retrospective Interviews

Field studies of disasters have been conducted beginning as early as two days and as late as five years after impact. Little is known about the effect of timing on the validity of disaster data, but these effects may be highly significant.

The difficulty of initiating the collection of data immediately after

impact has been indicated in the discussion of the planning of research. Furthermore, if researchers enter the field while rescue and clean-up operations are still in full swing, they are likely to find that many people do not have the time to be interviewed. They may also find that there is pressure on them to become participants in these operations, since the role of the scientist may appear callous and unsympathetic.

Later in the emergency phase, or early in the recovery phase, certain advantages accrue to the researcher from a reasonably early entry into the field. By this time, many people may have the time to cooperate as subjects, and the role of the scientist may be more acceptable to them. More important, there are indications that this is the time when it is easiest to gain rapport. Time and again survivors of disasters have shown themselves eager to talk about their experiences at this period.

In view of the present state of development of disaster research there is no reason for delaying field work until more than a year after impact, except when studies are concerned with the long-run aftereffects of disaster. Entry into the field may still be delayed for several months by problems of obtaining funds and personnel. There is a danger that during this interval subjects will have forgotten many details of their experience and that distortion of other recollections will have occurred. Interviewers should be on the alert for signs that a subject is giving stereotyped answers which have become standardized in previous discussions of the disaster. Through the rumor process quite inaccurate versions of what happened may come to be accepted by a large segment of a population. A "group version" of an event can develop during a very short period of discussion. In experiments in which small groups were subjected to a simulated emergency, Dr. Bradford Hudson found it necessary to separate the subjects immediately after exposure to the stimulus. He found that within 30 minutes a group might develop a standardized interpretation of the stimulus which would be accepted and reported by most of the members.

Persons experienced in disaster field studies report that disaster victims usually want to talk, to tell their stories; and there is quantitative evidence to this effect. Interviewers are seldom refused. Willingness to be interviewed, however, does not answer the question of whether serious biases creep into retrospective accounts of disaster experience. Experiences of disaster researchers and fragmentary evidence show only that we do not know with any precision how much bias, of what kinds, occurs among different types of respondents, under different circumstances, and at different periods after the disaster has occurred. Review of some tape-recorded interviews with disaster victims shows that they persisted in telling the story of what happened to them and to others, in spite of leading questions and improper probes from the interviewers which might have been expected to

divert the respondent in an ordinary interview. In these cases, the respondent seemed to insist on telling his or her story in spite of the behavior of the interviewer.

In general, the facts that (1) people so often report that they felt confused, were afraid, behaved maladaptively, or even did things of which they are now ashamed,¹⁴ (2) the experienced interviewer can often sense

14. William A. Scott describes this problem and the type of judgment which is often employed in evaluating it in his report of a study of people's reactions to an air raid signal which proved to be a false alarm in Oakland, California. This situation, on the assumption that distortion is encouraged when people are later proved wrong in their interpretation of the situation, would be one in which retrospective distortion might especially be expected to occur. Dr. Scott writes: "...When people are asked to recall what they felt, thought, and did a month or more ago, there is bound to be some omission or distortion unless the particular events involved were extremely striking. While those respondents who took the alert seriously at the time may have been impressed enough by the experience to recall all the details of their thoughts and actions at a considerably later date, it is quite likely that people who more or less ignored the alert would have forgotten how they actually did feel at the time. Moreover, there is a possibility that memory would err in the direction of how the respondent feels he should have behaved. A person who feels silly about having become excited over the siren may be reluctant to report, or even remember, his own excited reactions. Another who feels guilty for not having paid more attention may, consciously or unconsciously, make his behavior appear more responsive to the siren than it really was.

"These sorts of distortions and omissions are indeed possible, but we have no clear-cut evidence either that they did, or did not, occur. From the tone of the interviews and the variety of responses reported, the best judgment would appear to be that distortions about the kinds of behavior were not widespread, nor were they gross when they did occur. A great number of people reported confused thoughts (either ignoring the siren or becoming excited) in all frankness. Some of them regarded these reactions as quite appropriate, while others expressed their feelings of guilt over them in equally frank terms. This kind of frankness in reply was encouraged by the interviewing procedure. In all cases the interviewers used every possible means to put the respondents at ease and assure them that there were no 'right' or 'wrong' answers, that they just wanted complete, accurate accounts of people's opinions and behaviors. This 'non-directive' approach appears to have worked in the large majority of cases. People may not have been well informed in many instances, but they were probably truthful, for the most part." Public Reactions to a Surprise Civil Defense Alert in Oakland, California (Survey Research Center, University of Michigan, mimeographed 1 August 1955), pp. 3f.

distortions, bring about clarifications, and break through defenses in the respondent's story by skillful probing, and (3) stories concerning overt behavior can often be cross-checked with other respondents' stories of the same behavior, have led many disaster researchers to the subjective conclusion that by and large no gross distortions have been introduced into the findings of disaster research by retrospective distortion of faulty memory on the part of disaster victims respondents. Experienced researchers have learned to be more wary of such biases in the stories of officials or agency representatives who feel the need to represent the performance of their own or their agency's official roles in a favorable light. Amazingly frank stories are often secured from officials, but in reconstructing the story of actions of officials or agencies, extensive cross-checking is important.

In spite of the experience which has been developed and the inferences which are possible from this experience, the fact remains that no precise measurements exist to show us the extent and consequences of retrospective distortions and faulty memories in post hoc disaster interviews and to chart specifically the pitfalls which must be avoided in disaster field studies.

Systematic research on this problem is necessary before disaster field studies move to higher levels of scientific validity. Subjects should be re-interviewed at different times after a disaster to determine how much distortion and loss of detail occurs with the passage of time. In one study where subjects were interviewed two or three times, only minor difficulties were encountered in obtaining re-interviews with subjects who had already been interviewed once. The fact that another similar disaster had intervened between the first and subsequent interviews may account, in part, for this success.

Analysis of the Data

The methods of analyzing disaster field study data are the ones a competent investigator would normally select to suit the research design and the data collected. This is not a special problem. A few of the customary problems tend to become exaggerated in the analysis of disaster data, however.

The first point is to urge the investigator to give very careful consideration to situational variables and matters of context in building a code or other analytical scheme. As this report points out in several places, situational variables are sometimes especially important in understanding behavior in disaster. Many times the physical situation permits only a limited number of alternative actions by individuals and groups. An analysis of the perceptions, motivations, and actions of such subjects may be quite misleading if the code does not account for the possibility that some actions

or some sources of information were physically unavailable to the actor. A simple example will illustrate the importance of this point. The investigator may wish to know what proportions of persons of different types tried to aid other persons during the emergency. If the disaster is a flood and large numbers of people are isolated on rooftops, the analysis must take account of the people who had no physical possibility of helping others. Thus the Institute for Social Research in the Netherlands had to cross-classify the subjects by "physical circumstances during the flood" in analyzing assistance to others and other behaviors of disaster victims.¹⁵

The investigator will probably be unable to include all of the factors of situation, context, and background in his code and keep it manageable, but he should make as certain as he can that he has included the variables relevant to the particular hypotheses and relationships he wishes to analyze. It seems quite safe to say at this time that every code should identify the behaviors or events reported and each individual respondent in terms of time and space. The categories of time and space which are used will, of course, depend upon the research design and the data obtainable. The determination of how fine a time-space breakdown should be made in the sequence of events reported will also depend upon design and data, and upon the time and resources available for analysis. In any case, the events or sequences of behavior or feelings of most significance to the investigation should each be identified in this way. The spatial relationship of the respondent to the events he is describing should also be coded if possible.

Another thing which the analyst may be reminded of is the difficulty involved in ascertaining pre-disaster background characteristics of respondents from interviews conducted after the disaster. This is not difficult with respect to demographic and similar characteristics, but applies to any perceptions, memories, or personality characteristics of the respondent which may have been influenced by the disaster. It is the post-disaster individual who is interviewed. The investigator will, of course, deal with this problem as best he can in the planning of the research, but it may be well to remind coders of the dangers involved.

As has been previously pointed out, the field of disaster behavior inherited more than its share of stereotypes and semantical confusions. It has been suggested that interviewers be trained and supervised to avoid falling into these pitfalls; the same training and supervision needs to be given coders and analysts.

15. C. J. Lammers, Studies in Holland Flood Disaster 1953. Vol. II. Survey of Evacuation Problems and Disaster Experiences (Amsterdam and Washington: Institute for Social Research in the Netherlands and National Academy of Sciences-National Research Council, Committee on Disaster Studies, 1955).

Problems of Entree in Field Studies

It has been found that even two or three years after a disaster has occurred certain sensitivities of the population must be respected in gaining entree in a disaster area. Disaster research requires probing into areas which are, for various reasons, regarded as confidential. While victims will discuss their physical injuries, their property losses, and even their bereavements, they are careful with whom they discuss them. Individuals who have insurance claims or lawsuits pending are likely to be suspicious of interviewers. Officials of public agencies or private concerns may fear that research is designed to fix responsibility for disaster events.¹⁶ At a time when the nation is security conscious, researchers are quite likely to be asked to prove the legitimacy of their inquiries into the organization or operation of industries and branches of municipal or state government.

It is essential, therefore, that the research team establish an acceptable identity at the very beginning of a study. Presentation of credentials from a state or federal government agency, a university, or a well-known private foundation or research organization usually serves this purpose. In some cases, however, emphasis on one of these may increase resistance. For example, if a disaster has resulted in claims against the government it may be necessary to "play down" federal sponsorship and emphasize university connections. These conditions vary from one disaster to another and cannot be anticipated for any given disaster. To some extent the investigator must always "play it by ear." The alert investigator will soon discern that it will be to his disadvantage to become identified with a particular agency that happens to be in disrepute in a particular disaster.

It is desirable to secure the cooperation or, at least, the concurrence of city and county officials or of the heads of private concerns, before beginning field work in areas under their jurisdiction. Sometimes they will furnish credentials which are accepted locally without question. The use of such credentials is not always advantageous, however. A political rift in a city may make sponsorship by an incumbent mayor a handicap in getting the cooperation of his political opponents. Company approval makes workers suspicious if they feel the company is trying to evade responsibility for an industrial disaster.

It is always a safe procedure to inform police officials that field work is to be carried on in their bailiwicks. This usually insures their

16. This report has referred repeatedly to the research worker as the "investigator." The research worker will do well never to refer to himself as an "investigator" while in the field. This term has different, and negative, connotations to many people.

cooperation and precludes embarrassing incidents such as the detention and questioning of interviewers by police officers.

In many disasters it will be necessary to secure passes in order to gain access to the stricken area. These will usually be secured from the local police, but it may be the national guard, state police, or local civil defense agency that issues passes. In some cases more than one agency issues passes and, assuming the principle of maximum unhappiness, it could occur that one agency does not honor another agency's passes at first. The question of passes will usually have to be settled in the community but investigators may sometimes arrange credentials with the national guard or state police which will serve at the locality.

Before embarking on a field study, any team should make a vigorous effort to find out if anyone else is doing disaster research in the same area. The efforts of both teams may be hampered if they are not coordinated. Researchers should make a special attempt to avoid overworking the same subjects and thereby arousing resentment.

It is important in disaster research, as in other areas of social science research, to convince respondents that information they give will be held in strict confidence and that their anonymity will be preserved. As has been stated before, it is also important to persuade them that the data obtained with their cooperation will be put to significant, practical use.

The Reporting of Disaster Findings

While they have important theoretical implications, field studies of disaster are pre-eminently applied research. To the extent that a field study is designed to produce significant and useful conclusions, the results will be in demand among lay people who have been, or may be, affected by disaster. With this in mind, reports of disaster studies should be written as if they might be read by at least some of the erstwhile subjects.

This standard makes it imperative that, in the writing, the anonymity of subjects actually be guarded as carefully as they were assured it would be. It also demands that conclusions be stated in a concise, intelligible fashion, with neither their theoretical nor their practical meaning being obscured by professional jargon. Such reporting will not only enhance the reputation of disaster research among its sponsors but will also contribute to the advancement of social science and the acceptance of its findings.

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